Commentary

Enhancing patient safety through digital innovation: The missing links

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Introduction: The promises of digital healthcare

It is no secret that the healthcare systems across Europe are currently facing a series of crises and challenges.[1] While it has been established that every single EU country currently faces a shortage of health workers,[2] the demand of care is growing and is expected to grow even further due to the ageing population[3] and the increasing burden of chronic illnesses. As our rapidly changing societies test the limits of individual resilience, the nature of care is set to evolve, to become more holistic, integrated, person-centre[4] and more humane. Strengthening defenses and preparedness against pandemics and other major cross-border threats such as those brought by climate change remains also an area where progress is urgently needed.[5] And to make it more difficult still, all this must be achieved with shrinking budgets.

In this difficult context, digital innovation is often presented as a solution, or even the solution, that will make it possible to meet all the challenges at once.

Over the last years, technology's potential to transform the healthcare system has become increasingly undeniable, especially from the patient perspective. Among others, telemedicine and remote monitoring can help manage chronic or post-operative conditions, artificial intelligence (AI) and big data can help predict risks and personalise treatments, virtual reality devices can improve the training of healthcare professionals in surgical and emergency procedures, medication management systems have the ability to ensure the safe use of medication at every stage from prescription to administration.

While it is ethically sound and wise not to give in to the siren call of innovation and to remain vigilant about the evaluation and validation of technologies with a view to improving patient safety and outcomes,[6,7] progress is such that one might legitimately wonder whether it is not *unsafe* or *unethical* not to adopt some of well evidence-based technological solutions.

If digital health and available solutions hold so many promises, why are tangible results still a long way off? Again, from the patient perspective, why over one in 10 patients continue to be harmed during care, with approximately 50% of the safety lapses considered preventable?[8]

What are the missing links between technology potential and tangible results?

The specific context and needs of the different stakeholders in care delivery

The authors of this article, being actively involved in organisations dedicated to improving the safety and the quality of care, believe that achieving the potential of digital innovation requires careful consideration for the growing complexity of the healthcare systems and for the specific context and needs of the different stakeholders involved in the care delivery. Leading change in such an environment is a sensitive matter and has to be handled accordingly, listening to and understanding each other's needs, finding common ground to build on.

The day-to-day reality and the priorities of healthcare professionals

Careful consideration of their context and needs implies the absence of prejudice and the deconstruction of stereotypes, such as a so-called medical culture of resistance to change and digital innovation. Would this rather simplistic belief really fit with the reality of men and women who use technological tools in their daily lives? Why would they not in their professional lives?

The working conditions in which healthcare professionals seem to be a more consistent barrier: how could teams suffering from staff shortages, undermined by chronic fatigue[9] and overwhelmed by the growing demand for care, be engaged to uptake new digital tools and dedicate time to implement changes that will completely redesign their working habits?

Another obvious obstacle is the lack of information technology (IT) support and expertise to use the technologies,[10] a barrier difficult to overcome given the current high rate of innovation. Let's not forget either that healthcare professionals may have experienced in the past a disastrous implementation of a technology or IT system, leading to more administrative work or rework. Launch any of them on the subject and you'll quickly understand that it's a very sensitive matter.

Another way of reading this reality is to look less at the obstacles and more at the motivations of healthcare professionals in relation to technology, and to note that they appear to devote the time potentially freed up by a digital solution to improving the quality of care, to caring for their patients, to training and education and, finally, to a better work–life balance.[11] These seem to us to be enlightening priorities for mobilising healthcare professionals around the uptake and implementation of technologies. They should above all encourage debate on the use of possible efficiency gains associated with technology.

The delicate situation of healthcare managers regarding technology

Another simplistic assumption would be to think that healthcare managers' lack of enthusiasm for investing in new technologies is the main barrier to digital transformation and that it would mainly be due to shrinking budgets. In this view, public policies providing larger budgets or incentives to investing into digital innovation should quickly resolve the matter.

The shrinking budget part is not entirely wrong, especially given the current global economic context. However, this overlooks the fact that their primary mission is, while keeping the ship financially afloat, to respond to a growing demand for quality care with shrinking *teams,*[12] a situation largely due to challenging working conditions for the mental and physical health of the medical workforce.[13,14]

While the prospect of efficiency gains to compensate for staff shortages may seem tempting, the life sciences and medication markets are overwhelmed by technological innovation. In these conditions, which investment should be prioritised? How to find the time to carry out in-depth analyses to distinguish the qualities of one digital solution from another and assess its integral cost, maintenance included? How to confirm that a specific technology is really adaptable to the context of the organisation?

This last question is to be linked to another underestimated limiting factor, being the weight of technological history. Past investments have shaped digital and sometimes physical environments, in such a way that it can limit the ability to incorporate a new technology. Integration and Interoperability are key aspects which, if not managed, can lead to malfunctions, extra work, frustrations and additional departures.

Finally, the transformation of the digital environment brings new challenges to the management of medical data, as data breaches can have serious legal and patient trust impacts. Beyond security and privacy, data quality requires special attention as it can also compromise patient safety.

The changing role of the patient driven by technology

Even if patients can be presumed to have a positive a priori attitude towards technologies likely to improve their health and safety, many cutting-edge technologies require patients to be kept informed and even more involved. Telemedicine and remote monitoring, for example, require patients or informal caregivers (family, neighbours, friends) to participate in measuring parameters and reporting unusual symptoms. Digital medication support programmes to increase patient medication adherence require computer literacy.

The evolution is such that some see it as a veritable cultural transformation, supported by digital and objective data accessible to both caregivers and patients, leading to an equal level doctor–patient relationship, with shared decision-making.[15]

It is therefore of utmost importance to gauge patients' appetence for the digital devices put in place, and their ability to use them in a relevant and autonomous way or with the help of informal caregivers. Otherwise, all the efforts put into a digital solution will be in vain. There is even a risk of a rebound effect. For example, if remote monitoring coupled with AI to detect anomalies in the monitoring of parameters is not properly explained, it could generate mistrust and provoke inappropriate reactions on the part of the patient.

The reflexes and limitations of the companies developing digital solutions

Reducing life sciences and pharmaceutical companies to purely profit-driven bodies is a caricature. As any organisation, they are made up of individuals with a wide range of motivations. These motivations generally include the desire to respond to the need to improve patient safety and the quality of care. And this is where health and economic interests meet, since there is no viable business project without meeting a genuine need.

However, the technologies developed by these industries may not find their market, or they may be under-exploited, generating frustrations. There may be many reasons for this, but those on which the industries can act are -in their views- limited, given that interactions with the health professionals or with the patient are regulated and that what happens in the healthcare setting is beyond their reach and responsibility.

As a result, the companies behave most of the time like any economic player and act on the only levers that enable them to meet their need to differentiate themselves from their competitors: pushing the innovation cursor ever further, developing new functionalities and add-ons to their products, at the risk of promoting innovation for innovation's sake, pushing the human factor and ergonomics to the sideline, and blurring the clarity of the available offer.

Seeking convergence and recreating links

From theory to action: patient safety as guiding principle

Rather than setting the respective expectations against each other, blaming a specific stakeholder for missed

opportunities and slow digital transformation of the healthcare, seeking convergences and find a way to move forward based on common interests seems a more fruitful approach.

From the review of the various health stakeholders' priorities, a common interest which could act as a driver to align everyone's action is clearly emerging: the improvement of patient safety and outcomes. However, this common interest should be seen as tightly linked with the wellbeing and safety of healthcare professionals as, at the end of the day, the patient's fate relies in their hands and the implementation of any improvement requires their participation.[16] It therefore needs to be prioritised by all healthcare stakeholders, and particularly the managers of health settings, as a way of addressing issues of retention, burnout and fatigue of healthcare professionals.[17]

Fostering constructive collaboration between healthcare stakeholders around the improvement of patient safety and outcomes through digital transformation is a fine idea on paper but needs to be turned into reality. And the only way to do that is to look at the specific context of each care environment to assess priorities and, more specifically, its challenges in terms of patient safety.

A good place to start is with an internal process for reporting and analysing near-misses and adverse events, together with other sources or methodologies such as a patient reports of patient safety[18] or the use of 'triggers' or clues to identify adverse events.[19] Such a rational approach will make it possible to avoid, or at least limit, the risk of bias represented by games of influence within healthcare institutions, based on the prestige or volume of activity of an individual or a department.

If these figures are not tracked or are unreliable (in many countries it is still a legal or cultural issue to talk openly about incidents), national or global scientific studies could still provide details about the significance and the causes of a particular adverse event. However, they have the disadvantage of being disconnected from the reality of practice in the care environment concerned especially as, in recent years, the technologisation of care has led to more complex errors.[20] As a result, priority must be given to strengthening internal tracking and analysis of near-misses and adverse events.

Assessment of needs: The necessary involvement of the healthcare staff

The involvement of healthcare staff is essential to put the figures into context, detect patient safety risks and analyses their causes, propose improvements and most importantly implement them.

And that is where management must be open and agile; it may well be that the right solution to prevent a patient safety problem is not always technological. Revising a pathway or introducing a checklist-type routine may sometimes be more than enough. In some cases, technology can even bring additional problems instead of solving them. It may also be that a suitable solution lies with another kind of innovation, such as integrating a network or entering into a partnership to share knowledge, data, equipment and practices.

When it comes to defining a solution, the involvement of the staff produces another benefit, that of integrating both the needs of the patients and the vision the staff has of its own work. They will be the first to point out the risk represented by a technological solution that would have the effect of adding to their mental or physical workload, or of degrading the meaning of the care they provide, by reducing the quality of time they can make available to their patients, if only to express their attention and compassion.

These benefits will be particularly evident when it comes to drawing up the list of technical specifications for the proposed solution. Whether it's a question of essential functionalities, levels of interoperability, adaptability, alarm, navigability or ergonomics, the involvement of medical teams in the definition of the envisaged solution will offer the best guarantee of its use.

The implementation of digital solutions, a collaborative challenge

It would be easy to think of implementing a technology as simply grafting a new tool onto an existing process. However, most of today's technologies are disruptive in nature, requiring at the very least an adaptation of processes, or even a complete re-engineering. And it is only at this price that the benefits associated with the technology, both in terms of patient outcomes and efficiency, can be realised.

To achieve this, the medical teams will need to be given time to plan and carry out all the necessary stages: development of an alternative process, implementation of the solution in test mode, upskilling and training, gradual transition to the new process, evaluation and corrective adjustments. And it is unrealistic to imagine that they will be able to do this in addition to their usual work, when they are already struggling to provide a high-quality care to all their patients. Or to achieve that without any support in terms of project management.

It is also at this stage that increased collaboration with an industrial supplier can make sense. For instance, what would prevent an industrial company from venturing further into the field of assistance with the implementation of their technologies, to ensure that they are used to their best? Some leading companies have already demonstrated that it was possible to develop a recommended implementation plan, a target pathway and specific hands-on training,

to provide experts throughout the implementation process and after, underlying the importance of communication around problems and incidents. The industrial company acting in this way facilitates the implementation of its solution, ensures that it is used appropriately to achieve its potential, and gains a competitive advantage.

It is also at this stage that patient involvement proves crucial, to configure the solution in the best possible way, adapting it to different patient profiles and addressing issues such as data privacy and quality, digital literacy, security and lack of trust.

Conclusions

The operational approach developed in this article aims to encourage discussion and collaboration between health stakeholders around the possibility and conditions to enhance patient safety and outcomes through innovation in all healthcare settings across Europe.

In this article we have suggested the following ways forward:

1. Rather than blaming any specific stakeholder (healthcare professionals, healthcare managers, patients, industry) for the missed opportunities and slow digital transformation of healthcare, convergences should be sought around an obvious common interest: improving patient safety and outcomes.
2. At the level of each care setting, the assessment of patient safety priorities is a key point that should not be overlooked. Healthcare professionals should be closely involved in putting the figures into context, identifying patient safety risks, analysing their causes and proposing improvements that meet patients' needs, the vision of their own work and their wellbeing and safety.
3. When an improvement under consideration involves investment in a digital solution, the close involvement of medical teams could be the best guarantee of its use, providing valuable input on essential functionalities, levels of interoperability, adaptability, alarms, navigability or ergonomics.
4. The successful implementation of any digital solution is a challenge whose complexity should not be underestimated and which will benefit from increased collaboration between management, healthcare professionals, development companies and patients. Time, proactivity and good project management are the key resources.

This issue is so important it was made the main theme of the annual European Patient Safety Foundation conference in Madrid in November 2024 with the aim of raising awareness and promoting convergence at a more institutional level. Healthcare professionals and providers, patient representatives, academics, insurance companies, the life sciences industry and policy-makers will be invited to reflect on what each of them do or could do within the increasingly complex healthcare systems, in Spain and across Europe, to accelerate towards a reality where the improvement of patient safety and outcome drive all actions.

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